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Integrating Nature-Based Solutions into Higher Education towards exploiting the transformative potential of Social Economy for a green and inclusive future

WP4 - Development of the Green SE curriculum

Challenge-based learning resources for identifying specific urban challenges and developing multi-angle understanding of the problems

Responsible partner: ZERO

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List **of abbreviations:**

CBL	Challenged-Based Learning
NBS	Nature-based solutions

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1. Abstract & keywords

The transition towards sustainable urban living calls for innovative learning approaches that directly focus on pressing environmental and social issues. The module discusses developing a green curriculum for the social economy through Challenge-Based Learning in identifying the urban challenge and attaining a multi-perspective view of the complexities of the problems.

The focus of the module is on equipping learners with the skills to tackle issues such as climate change, resources management, and urban inequality through collaborative, real-world problem-solving. It formulates a curriculum framework that merges ecological literacy, interdisciplinary collaboration, and practical engagement with community stakeholders.

The module will apply CBL to enhance critical thinking and problem-solving learning in sustainability education, with a particular emphasis on urban settings. It involves curriculum design, implementation in pilot settings, and qualitative analysis of outcomes based on student and community feedback using a mixed-methods approach.

The module and the proposed activities to develop with students highlight the potential of CBL in promoting systems thinking and actionable insights into urban sustainability challenges.

This research contributes to the growing body of work on educational innovation by demonstrating how green curricula can empower learners to become agents of change in the social economy.

Keywords:

Green curriculum, Challenge-Based Learning (CBL), Social economy, Urban challenges, Sustainability education, Interdisciplinary collaboration, Systems thinking, Environmental literacy, Community engagement, Educational innovation

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2. Introduction to the module & its objectives

For students to develop an interest in learning about Nature-Based Solutions (NBS) they must first understand the real problems in their environment. This module aims to utilize challenge-based learning resources to identify specific urban challenges and foster a multi-dimensional understanding of these issues, enabling students to become genuinely interested in exploring the practical solutions that can address them.

Objectives

1. Equip participants with tools and resources to identify specific urban challenges.
2. Foster a multi-dimensional understanding of urban problems through Nature-Based Solutions (NBS).
3. Enable participants to apply Challenge-Based Learning (CBL) frameworks to real-world scenarios.

Urban Challenges in Focus

Urban environments face multi-faceted challenges that can benefit from the integration of NBS. Some examples include:

- Air and water pollution.
- Urban heat islands and climate adaptation.
- Lack of green spaces for mental and physical health.
- Stormwater management and flood control.

Participants will use CBL techniques to identify these issues in their local or regional contexts.

3. Learning outcomes & target groups

By the end of this module, participants will:

- Develop skills to identify and analyze urban problems and their interconnected nature.
- Present a multi-faceted analysis of a specific challenge.
- Propose an NBS-oriented solution with an implementation plan.
- Build skills in collaborative problem-solving and design thinking

The beneficiaries of this module are university students and educators with no background in ecology, biology or engineering, who want to deepen their knowledge in Challenge-Based Learning.

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4. Introduction to Challenge Based Learning

Challenge Based Learning provides an efficient and effective framework for learning while solving real-world Challenges. The Challenge Based Learning (CBL) framework is collaborative and hands-on, asking all participants (students, teachers, families, and community members) to identify Big Ideas, ask good questions, identify and solve Challenges, gain in-depth subject area knowledge, develop life skills, and learn how to learn. Challenge-Based Learning isn't a straight formula or lesson plan. It's a flexible framework that empowers Learners as co-owners and co-authors of their learning process, where everyone is a learner.

The Challenge Learning Framework includes three interconnected phases: **Engage, Investigate and Act**.
These three phases create a structured yet flexible framework that guides learners from curiosity to action. In the *Engage* phase, students are introduced to a *Big Idea*—a broad, relevant theme that invites multiple perspectives. An *Essential Question* personalizes this theme, making it more meaningful, while the *Challenge* transforms it into a compelling call to action. Once engaged, learners move into the *Investigate* phase, where they explore *Guiding Questions*—key inquiries that help them develop an informed response to the Challenge. Through targeted *Activities and Resources*, they conduct research, gather insights, and analyze information. This culminates in *Synthesis*, where they connect their learnings to lay the groundwork for a potential solution. Finally, in the *Act* phase, students develop and refine their *Solution* based on their findings, then put it into practice through *Implementation* in a real-world setting. They conclude with *Evaluation*, assessing the effectiveness of their solution and making necessary adjustments. Each phase includes activities that prepare you to move to the next phase. There are opportunities within each phase for mini-exploration cycles and, if necessary, a return to an earlier phase. Supporting the entire process is an ongoing process of **documentation, reflection and sharing**. *Documenting* the experience through audio, video, images, and photography helps capture key moments, progress, and insights, allowing learners to revisit and analyze their journey. Regular *reflection* provides opportunities to assess what is working, what challenges arise, how learners are feeling, and what they have discovered along the way. Finally, *sharing* their experiences, challenges, and solutions with an authentic audience fosters collaboration, invites valuable feedback, and can inspire others to take action. By embedding these practices throughout the Challenge Learning Framework, learners not only develop critical thinking and problem-solving skills but also cultivate a sense of ownership, confidence, and connection to the broader community.

CBL is flexible and customizable and allows for multiple points of entry. The approach can connect and extend current practice, serve as the framework for specific capstone events during the school year, and act as an overarching institutional-wide framework for decision-making and learning.

Below we share some key ideas about the CBL:

1. Teacher/Learner and Learner/Teacher. Ubiquitous access to information and technology allows the opportunity to break down the traditional hierarchical structure of schools and allows all participants to become teachers and learners.

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2. Moving beyond the four walls of the classroom. Involving all of the community members in the process expands resources, creates opportunities for authentic learning and moves the responsibility of education to the larger community.
3. Learner Inspired, Directed, and Owned. CBL develops meaningful connections between content and the lives of Learners.
4. Challenges Provoke Action. Situations or activities that create a sense of urgency and spur action.
5. Content and Durable skills. Authentic learning experiences foster deep content knowledge and help Learners develop a wide range of durable skills organically.
6. Boundaries of Adventure. Boundaries guide the way and provide freedom for Learners to take ownership of the process in a safe environment.
7. Space and Freedom to Fail. CBL is a safe space for all learners to think creatively, try new ideas, experiment, fail, receive feedback and try again.
8. Slowing for Critical and Creative Thinking. The learning process intentionally slows down to ensure full participation and provide opportunities for deep thinking.
9. Authentic Use of Technology. Technology supports the process authentically, including research, communication, organization, creation, evaluation, documentation and persuasion.
10. Focus on Process and Product. Getting to the solution is valued as much as the solution.
11. Documentation and Storytelling. During each step of the challenge process, the learners document and publish using text, video, audio and pictures.
12. Reflection. Throughout the process, learners continuously reflect on the content and the process.

5. Case studies / good practices / real-life examples

Challenge-Based Learning (CBL) has proven to be an effective approach for addressing specific urban challenges through diverse case studies and real-world applications.

European Consortium of Innovative Universities (ECIU)

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The ECIU are an alliance of 14 universities united by a joint goal to make an impact:, learners, teachers, and researchers work with cities, communities, and businesses to solve real-life challenges – and foster change.

ECIU hosts workshops that showcase how CBL enables students to identify, analyze, and design solutions to pressing urban issues. One such initiative, the workshop "Basic Principles of Challenge-Based Learning (CBL)," brought together institutions like the University of Trento and other ECIU partner universities to explore innovative applications of this methodology. Organized as part of the broader ECIU project, the workshop emphasized implementing and promoting a new European model for integrating research, education, and innovation while fostering collaboration with the business sector. In an era of rapid technological advancement and complex societal challenges, universities are transforming their educational approaches to equip students with the ability to address multifaceted problems from diverse perspectives. Echoing the philosophy of anthropologist Margaret Mead, these efforts focus on teaching students "how to think" rather than "what to think." For instance, the seminar "Sostenibilità e pratiche del consumo alimentare," organized by the Department of Sociology and Social Research at the University of Trento, demonstrates CBL in action. Working groups in this seminar analyze sustainability dimensions related to food consumption, providing students with a practical framework to tackle real-world issues collaboratively and innovatively.

NBF Challenge - Wageningen University

At Wageningen University & Research, leading scientists and students from around the globe collaborate on impactful projects that enhance the quality of life. With a strong focus on tackling climate change and biodiversity loss, they are dedicated to unlocking the potential of nature-based solutions.

The Nature-based Future Challenge, inspired by the visionary project *The Netherlands in 2120*, invites multidisciplinary student teams to reimagine how nature-based solutions can address the challenges posed by climate change and biodiversity loss.

For the 2023/2024 edition, the challenge focused on the Bangladesh Delta, one of the world's most climate-vulnerable regions. Students were tasked with creating an innovative, nature-based vision for the year 2120. Their work involved analyzing soil, water, and other critical data, as well as engaging with local stakeholders, to produce spatial planning maps and compelling visual renderings of a nature-positive future.

Looking ahead, the 2025/2026 edition will shift its focus to the Mississippi Delta, continuing the mission to inspire sustainable solutions for vulnerable regions worldwide.

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Image 1.participants of the NBF Challenge edition 23/24

Reduce Waste - Carroll Middle School, Raleigh, North Carolina

The Challenge-Based Learning website highlights stories from schools and universities worldwide, demonstrating how challenges can drive positive change in communities. One example is a project at Carroll Middle School, where students tackled the challenge of reducing waste. By engaging in conversations with custodians and cafeteria staff, they discovered an unused compost bin on campus. The students collaborated to raise awareness about food waste and organized weekly collections to utilize the compost bin effectively.

The City of 1,5ºC - Interuniversity Sustainability Challenge

Moreover, the "Handbook Challenge Based Learning" provides a collection of past and current challenges, offering detailed examples of CBL applied to urban issues. These case studies include topics like preventive health challenges and sustainable city planning, illustrating the practical application of CBL in addressing urban problems. The learners collaboratively worked on a complex, real-life challenge and worked on possible solutions using a design-based approach. In the course “The city of 1.5ºC challenge” - In the Interuniversity Sustainability Challenge, second-year bachelor

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students from different disciplines have reflected on how to change and adapt for the sustainable city of the future. This inter-university collaboration aimed to bring people together outside of learners' familiar settings and benefit from the expertise and perspectives others offer. It also revealed from which knowledge, expertise, skills, perspectives and cultural aspects learners approached the project.

The learners collaboratively worked on a complex, real-life challenge and worked on possible solutions using a design-based approach. The project was called Almere Pampus, and the project experts had the role of societal stakeholder. The learners' task was to develop a scientifically-sound solution to this challenge from a transdisciplinary perspective. They were required to integrate various academic and non-academic perspectives to create new knowledge and work towards a common goal.

6. Competence-based activities & ready-to-use lesson plans

During activities give time and space to:

Research Depth – Quality and relevance of gathered data.

Creativity – Originality and feasibility of solutions.

Team Collaboration – Effective teamwork and contribution.

Presentation – Clarity, visuals, and communication.

Reflection – Insights and lessons learned

Design Thinking Framework: Guide participants through ideation, prototyping, and testing phases.

Example of a lesson-plan or competence-based, hands-on activity:

Exploring Urban Challenges and Solutions	
Objectives, Competencies and Learning Outcome	This activity aims to foster awareness and understanding of urban challenges by directly involving students in identifying problems and thinking collectively on solutions for those problems. By discussing with other people with other perspectives, students can identify the impact of urban planning and the benefits of NBS
NBS topic(s) – if applicable	Green urban Areas: urban parks, pocket parks Storm water management Green and Blue Infrastructures
Recommended age of students (specify the range of	undergraduate students

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students who can take part in this activity)	
Skills (21st century, green competences) that the activity promotes	- Clarity and depth in identifying and understanding urban challenges - Creativity, Collaboration and Engagement (teamwork) - Clear communication and persuasive argumentation in pitching solutions. - Reflection
Necessary materials/ resources **(online & offline if it is a physical ctivity)**	Flipchart, pens with different colours. No prior knowledge is needed
Location/Venue	Physical activity
Duration (including the preparation and application time)	2h activity + time to present depending on the number of groups - 10mins per group would be ideal
Instructions/ How to apply the activity the /lesson plan	**Phase 1: Identifying Urban Challenges** Each student writes down three urban problems on small pieces of paper and folds them. The papers are collected in a box or hat and mixed. **Phase 2: Assigning Problems and Research** Students are divided into small groups. Each group randomly draws a paper to determine their assigned urban problem. Groups research their problem, analyzing its causes, environmental, social, and economic impacts. They explore possible Nature-Based Solutions (NBS) to address the issue. **Phase 3: Creating a Flipchart** Each group summarizes their research on a flipchart, including the problem, impacts, and proposed NBS solutions. The flipchart should be clear, structured, and visually engaging. **Phase 4: Presentation and Discussion** Groups present their findings to the class. The class engages in a discussion, comparing problems, solutions, and the role of NBS in sustainable urban development.
Involved stakeholders (apart	-

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from students/ educators)	
Reflection moments / assessment method	Each group will present their flipcharts to the rest of the class, facilitating knowledge sharing and discussion. This allows students to learn from each other's work and gain a broader perspective on various urban challenges.
Useful Tips	Provide Examples – Share urban problems and NBS solutions to guide students. Encourage Diverse Topics – Prompt students to think beyond common issues. Support Research – Offer resources for credible information. Guide Group Work – Check in, ask questions, and refine ideas. Facilitate Discussion – Ask thought-provoking questions. Connect to Reality – Link findings to real-world cases or experts.

Role-Playing Debate on Urban Problems	
Objectives, Competencies and Learning Outcome	The main objective is to try to encourage students to explore different perspectives on urban problems, develop empathy for diverse viewpoints, and practice negotiation skills to find common ground. Students will role-play as characters impacted by the decision to replace a Students will need a notebook and pens to writegreen public park with a parking lot in the city. Each character has a unique perspective and motivations, reflecting real-world complexities of urban planning. The group should achieve a final solution by listening to different people' perspectives of the same problem. <u>Learning Outcomes:</u> Students will develop multi-angle understanding of the problems They will practice active listening and respectful debate. They will explore solutions that consider multiple stakeholders' interests and try to implement NBS for specific problems.
NBS topic(s) – if applicable	Green Urban Areas Green and Blue Infrastructures
Recommended age of students (specify the range of students who can take part in this activity)	Undergraduate students

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Skills (21st century, green competences) that the activity promotes	System thinking, Analytical skills, Critical thinking, Communication skills, Collaboration, Empathy, Critical Self-Reflection, Ethical reasoning
Necessary materials/ resources (online & offline if it is a physical activity)	There is no prior prior knowledge needed from students to participate in the activity
Location/Venue	Physical activity
Duration (including the preparation and application time)	1h activity
Instructions/ How to apply the activity the /lesson plan	By defending the role of a certain character, the various elements will discuss and they will understand different perspectives on the same situation. **Preparation (10 minutes):** - Assign each student a role and provide them with a brief description of their character's perspective and motivations; Encourage students to brainstorm their character's arguments and concerns. **1. Daily Car User:** *Perspective:* Thrilled with the new parking lot as it makes commuting more convenient; *Motivation:* Believes the parking lot will reduce their stress and improve the city's infrastructure for drivers. **2. City Walker:** *Perspective:* Disappointed and upset about losing the green park; *Motivation:* Misses the peaceful environment of the park and believes the city needs more spaces for relaxation and recreation. **3. Sunlight-Seeking Resident:** *Perspective:* Pleased with the removal of the park's trees because they blocked sunlight into their home; *Motivation:* Values increased sunlight in their home and views the change as beneficial to their quality of life. **4. Environmental NGO Representative:** *Perspective:* Deeply saddened and frustrated by the destruction of the park; *Motivation:* Advocates for preserving green spaces to combat climate change, protect biodiversity, and improve city life. **Debate:**

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	- Set the scene: Imagine a town hall meeting where community members are discussing the decision to replace the park with a parking lot. - Each student presents their character's viewpoint in 1–2 minutes. - Encourage respectful debate as students respond to one another's statements, highlighting agreements and disagreements. **Negotiation:** -Facilitate a discussion where students work together to find a compromise. - Potential compromises might include planting trees around the parking lot, creating a rooftop garden on the parking structure, or designating a new area for a green park nearby The group will have to try to achieve a final conclusion and to identify possible NBS to be implemented to address this specific urban problem.
Reflection moments / assessment method	After the debate, have students step out of their roles and discuss the activity. Questions for reflection: - How did you feel representing your character? - Was it easy or difficult to find common ground? Why? - How can cities balance different needs when planning urban spaces?
Useful Tips	**Encourage Role Immersion** – Ask students to fully embody their assigned character by thinking about their motivations, emotions, and arguments. **Promote Respectful Discussio**n – Establish ground rules for a constructive debate, ensuring all viewpoints are heard without interruption. **Guide the Negotiation Phase** – Help students find common ground by asking guiding questions like, "What solutions could address multiple concerns?" **Ensure All Voices Are Heard** – If some students are hesitant to speak, prompt them with questions or allow smaller group discussions before the debate. **Summarize Key Takeaways** – After the debate, reflect on what was learned, highlighting how NBS can balance different urban needs.

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The Nature-Based Solutions Challenge	
Objectives, Competencies and Learning Outcome	**Objectives:** Help students understand the spectrum of Nature-Based Solutions (NBS) and their applications and encourage creativity, teamwork, and problem-solving in designing NBS for real-world challenges. **Competencies:** Systems thinking: Understanding how NBS integrate environmental, social, and economic dimension; problem-solving and decision-making and creative skills. **Learning Outcome:** Students will be able to distinguish between the three types of NBS and apply them to environmental challenges.
NBS topic(s) – if applicable	Introduction to Nature-Based Solutions (NBS). Exploring benefits and applications of NBS.
Recommended age of students	Undergraduate students
Skills (21st century, green competences) that the activity promotes	**Embodying sustainability values**: Recognizing the importance of biodiversity and ecosystems. **Interdisciplinary working**: Collaborating across disciplines to propose solutions. **Envisioning sustainable futures**: Developing innovative approaches to real-world problems.
Necessary materials/ resources (online & offline if it is a physical ctivity)	Large sheets of paper or whiteboards. Markers, sticky notes, and colored pens. Handouts/Powerpoint slide summarizing the three types of NBS. Pre-prepared challenge cards describing environmental issues (good-to-have)
Location/Venue	A classroom or collaborative workshop space with tables and chairs for group work.
Duration (including the preparation and application time)	Total: 1h30-2 hours (including preparation and application). ● Preparation: 15 minutes (setting up materials and explaining the activity). ● Activity: 1h - 1h30 ● Wrap-up: 15 minutes
Instructions/ How to apply the activity the /lesson plan	***Setup:*** *Arrange tables or groups of chairs to form small groups of 4-5 students.* *Have a "resource station" with art supplies and the NBS handouts.* **Introduction (10 minutes):** ● If not already explained, begin with a brief presentation explaining the concept of NBS and the three types. Highlight examples from the manual (in campus and outside campus) to give students a clear picture. ● Distribute the handouts summarizing the NBS types or project the slide with a clear differentiation between NBS types **Group Formation (5 minutes):** Divide students into small groups of 4-5. Each group will act as an "NBS Design Team."

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	Challenge Distribution (5 minutes): Give each group a challenge card describing an environmental issue. For instance, some Challenge Cards Examples could be ○ **Challenge 1:** A coastal town faces increasing erosion and storm surges due to rising sea levels. ○ **Challenge 2:** An urban area is plagued by flooding during heavy rains, disrupting daily life. ○ **Challenge 3:** A rural community's agricultural productivity is declining due to poor soil quality and loss of biodiversity. ● **Optional**: Instead of distributing a challenge card, an extra step can be delivered at this moment, in which the participant groups are invited to create a scenario, based on their own experience or their hometowns, for those scenarios to be randomly distributed to another group. You can give the examples stated above, with more or less detail and ask for an inventive but realistic scenario created by the students. A suggestion would be to have a template of a scenario so participants can more easily design their scenarios: ○ Type of town: Coastal, urban, rural, etc ○ Location (within the country they are) ○ Small socio-economic description ○ Challenge/Problem the town is facing due to the consequences of climate change **Brainstorming and Design Phase (30 minutes):** ● Each group must: ○ Identify which type(s) of NBS (Type 1, Type 2, or Type 3) are most appropriate for their challenge. ○ Develop a creative and practical solution. It should be stated that the town parish had budget cuts last year, thus not welcoming very expensive projects ○ Prepare a visual representation of their solution (e.g., a drawing, flowchart, or diagram). ● Encourage groups to think outside the box and integrate economic, social, and environmental aspects. **Presentation and Feedback (30 minutes):** Each group presents their solution to the rest of the class in 5 minutes. The instructor and peers provide constructive feedback and discuss how well the solution aligns with the NBS framework. **Debrief and Reflection (10 minutes):** Facilitate a discussion on: ● What students learned about the three types of NBS. ● The challenges and benefits of designing NBS solutions. ● Real-world implications and examples they found most compelling.
Involved stakeholders	Environmental professionals for feedback (optional)

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Reflection moments / assessment method	Each group will have another group, randomly selected, to be their observer, embodying the parish representatives getting a pitch presentation on a project. This observer group should register the strengths and weaknesses of the project proposed and make questions in the end of the presentation to test the robustness of the project Use the flipcharts as an informal assessment of students' understanding and creativity.
Useful Tips	Use real-world examples in the introduction to ground the concepts. Encourage students to think beyond environmental factors and include social and economic dimensions.

Investigating Urban Challenges through Sociological Research	
Objectives, Competencies and Learning Outcome	**Objective:** Students will explore urban environmental challenges, identify their causes, and gain insights into public perceptions and experiences by conducting interviews. They will analyze and present their findings to the class. **Learning Outcomes:** - Students will develop an understanding of urban environmental issues and their underlying causes. - They will practice interviewing and data collection skills. - They will learn to synthesize diverse perspectives and reflect on real-world challenges. This hands-on activity connects students to their community, fostering empathy and awareness of shared urban challenges while encouraging critical thinking and collaborative problem-solving.
Recommended age of students (specify the range of students who can take part in this activity)	Undergraduate students
Skills (21st century, green competences) that the activity promotes	System thinking, Analytical skills, Critical thinking, Communication skills, Collaboration, Empathy, Critical Self-Reflection

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Necessary materials/ resources **(online & offline if it is a physical activity)**	Students will need a notebook and pens to write. There is no prior prior knowledge needed from students to participate in the activity
Location/Venue	Physical, inside and outside the school if possible
Duration (including the preparation and application time)	3h activity
Instructions/ How to apply the activity the /lesson plan	**Preparation:** The teacher starts by assigning urban challenges such as: Heat island effect, Excessive concrete surfaces, Heatwaves, Lack of trees and green spaces, Flooding due to poor drainage, Climate change impacts, Greenhouse gas emissions to each group of students to investigate. After students will research the problems: - Investigate the causes and effects of their assigned challenge using books, articles, or digital resource, as well as, - Summarize their findings in a brief report or notes. **Develop Interview Questions:** Students, in the role of sociologists, create 3–5 open-ended questions to guide their interviews. Examples of questions: - "Have you noticed or experienced this problem? How has it affected you?" -"What do you think causes this issue in our city?" -"What solutions would you propose to address it?" **Conduct Interviews**: Students will go outside the classroom (or school, if permitted) to interview people from various demographics (different ages, professions, etc.), will record opinions, experiences, personal stories or examples related to the problems and suggested solutions. **Later they will have to Analyze Findings and Present it to the class** Students review their interview notes and have to identify common themes or recurring opinions, highlight unique perspectives or surprising insights and compare public perceptions with their research findings.
Involved stakeholders	-

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Reflection moments / assessment method	Facilitate a discussion and reflection on: - Common challenges and themes across different urban issues. - The importance of incorporating public perspectives in addressing urban problems.
Useful Tips	**Provide Research Resources –** Share articles, reports, or websites to help students investigate their assigned challenge effectively. **Assist in Question Development** – Guide students in crafting clear, open-ended interview questions that prompt meaningful discussions. **Encourage Diverse Perspectives** – Suggest students interview individuals from different backgrounds (age, profession, lifestyle) for varied insights. **Encourage Comparison** – Have students contrast public perceptions with their research findings to deepen understanding.

7. Further resources – necessary materials

Specify if further resources are needed for applying the activity

The following materials are extra, helpful materials but not necessary materials to develop the previous activities proposed:

UN Sustainable Development Goals (SDGs)- Use Goal 11 (*Sustainable Cities and Communities*) as a reference to contextualize urban challenges

https://sdgs.un.org/goals/goal11

UN-Habitat Urban Data: Provides global data and insights into urban development issues, including housing, waste management, and resilience.
https://data.unhabitat.org/

World Bank Open Data: Offers a wealth of information on urban indicators like population density, air quality, and infrastructure.
https://data.worldbank.org/

Local Government Open Data Portals - Many cities provide open data portals with information on demographics, urban planning, transportation, and environmental metrics.

Urban Nature Atlas

https://una.city/

Citizen Science Platforms - iNaturalist: Engage learners in biodiversity mapping to understand local ecological challenges.
https://www.inaturalist.org/

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Documentaries:

The Human Scale (2012) - The Danish architect and professor Jan Gehl has studied human behavior in cities through four decades. He has documented how modern cities repel human interaction, and argues that we can build cities in a way, which takes human needs for inclusion and intimacy into account. 'The Human Scale' meets thinkers, architects and urban planners across the globe. It questions our assumptions about modernity, exploring what happens when we put people into the centre of our planning.

Urbanized (2011) - A documentary about the design of cities, which looks at the issues and strategies behind urban design and features some of the world's foremost architects, planners, policymakers, builders, and thinkers.

8. List of online & offline teaching material

At this section, please make **a list of any online or offline material** that are useful for piloting / applying the module in real-life setting (& in the piloting of the whole curriculum as part of our project).

https://www.challengebasedlearning.org/ - is a website full of resources regarding Challenge based learning methodology

https://www.challengebasedlearning.org/wp-content/uploads/2019/02/CBL_Guide2016.pdf **Challenge-Based Learning Framework -** Apple's CBL Guide provides a structured approach to identifying and solving challenges

https://www.challengebasedlearning.org/toolkit/ - It's a library with resources related to Act, Assessment, Big Ideas, Engage, Investigate, Process and Reflection

9. References

Make a list with all references that you used per section for this module.

(1) https://www.challengebasedlearning.org/wp-content/uploads/2019/02/CBL_Guide2016.pdf
(2) https://www.eciu.eu/
(3) https://www.eciu.eu/news/challenge-based-learning-finding-solutions-to-real-problems-as-a-learning-strategy-a-workshop-organized-by-eciu
(4) https://www.nbfchallenge.nl
(5) https://www.challengebasedlearning.org/project/carroll-middle-school-reduce-waste/
(6) https://challengebasedlearning.ewuu.nl/case-studies/iusc-challenge/

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